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Review Article

Support for parents of deaf children: Common questions and informed, evidence-based answers

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ABSTRACT

To assist medical and hearing-science professionals in supporting parents of deaf children, we have identified common questions that parents may have and provide evidence-based answers. In doing so, a compassionate and positive narrative about deafness and deaf children is offered, one that relies on recent research evidence regarding the critical nature of early exposure to a fully accessible visual language, which in the United States is American Sign Language (ASL). This evidence includes the role of sign language in language acquisition, cognitive development, and literacy. In order for parents to provide a nurturing and anxiety-free environment for early childhood development, signing at home is important even if their child also has the additional nurturing and care of a signing community. It is not just the early years of a child's life that matter for language acquisition; it's the early months, the early weeks, even the early days. Deaf children cannot wait for accessible language input. The whole family must learn simultaneously as the deaf child learns. Even moderate fluency on the part of the family benefits the child enormously. And learning the sign language together can be one of the strongest bonding experiences that the family and deaf child have.

1. Introduction

96% of deaf babies are born to hearing parents who, initially, are uninformed about and unprepared to raise a deaf child [1]. (We use *deaf* to include all levels of hearing loss.) They need advice, and they often turn to doctors for it. Doctors, on the other hand, may have anxiety about what to say to parents following newborn hearing screening [2]. How they advise those parents can have decisive influence on both the cognitive and psycho-social health of the children (as we argue below). The present paper aims to help doctors as they advise these parents.

1.1. Our starting point: the case for bimodal-bilingualism

Deaf children in general are academically at risk [3], where the lack of a solid language foundation may be the major culprit [4]. Many deaf children are raised in a zero-tolerance-to-alternatives oral environment, that is, strictly orally, but the auditory information they receive through cochlear implants (CIs) or hearing aids may not assure language access. Early exposure to language is critical, starting at birth. Human beings are hardwired to acquire language – any natural language, including sign languages and spoken languages [5,6] – but the window of opportunity on full first language acquisition is drastically reduced after the first few years of life [7]. If a child becomes deaf after this sensitive period for first language acquisition, that child may already have enough of a foundation in the spoken language to thrive or, at the least, manage linguistically in a strictly oral environment. But the congenitally deaf child is our focus here, the child who needs frequent and regular exposure to an accessible language while the brain is still plastic enough to acquire language. If that child is left without accessible

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language during the sensitive period, that child may experience linguistic deprivation, which leads to serious language delays and cognitive deficits [8–10], as well as other health [11] and psycho-social problems [12–16].

This means lack of language access is a medical issue that must be addressed and, importantly, addressed without the baggage of the heated debate concerning sign versus speech – a debate that has been cast as cultural [17]. The relevant issue is, instead, language versus lack of language. The *International Journal of Pediatric Otorhinolaryngology* focusses on prevention, cure, and care of otorhinolaryngological disorders in infants and children, including disorders of communication and language. The paper here is a contribution toward the prevention of linguistic deprivation and of the wider cognitive, health, and psycho-social harm that accompanies it [18]. Further, deaf children who cannot communicate fully with those around them are more often victims of abuse [19–21], and as adults experience a higher rate of imprisonment [22] and unemployment [23] – all factors indicated in poor health. We aim to guide medical professionals as they advise parents so that cognitive disability and other health problems not be caused where none need be.

In short, speech is accessible to only some deaf children, including those with CIs, whereas sign is accessible to all deaf children, including deaf/blind children through a tactile modality [24,25]. We do not here address or review the research on CIs, which is extensive and which shows fine success for some deaf children, other than to note that CI with a speech-only protocol does not guarantee first language acquisition. A parent may 'do everything right', and still the child may not access speech sufficiently to acquire language [26–31]. No one can reliably predict which children will benefit from using a CI and which will not; results are highly variable [32–34]. While a variety of studies of children with CI in a variety of journals concludes that the device is valuable, and while researchers are constantly searching for factors that correlate to improved success of CI [35], the results reported can cause alarm. For example, in a study that the authors considered to show success of CI, 20%–36% of deaf children with CI performed between the 25th and 75th percentile or better compared to hearing peers when assessed 3–5 years after implantation [36]. That rate may be impressive for the medical device, but the fact is, 80%–64% of the children performed below the 25th percentile. Whether these results are a reflection of absence of a first language in many children or simply a reflection of rather ordinary to poor language usage, such disturbing results should be viewed as unacceptable. Deaf children, like all children, have the right to language. And deaf children, like all children, should have the potential not just to communicate in basic interactions with language, but to produce and understand complex and eloquent communication. This advanced communication ability also allows the child to engage in group conversations with family members and others.

Because of the high degree of variation in the benefit of CI, the speech-only pathway to language acquisition carries inherent, serious risks. No one should wait to see how well a child accesses spoken language with a CI, risking such serious harm, especially since often that realization doesn't happen until after the child falls far behind in schoolwork [37]. No parent of a prelingually deaf child should rely on CI alone for first language acquisition. Instead, parents and professionals should immediately expose the child to a sign language. Offering the deaf child a sign language alongside a spoken language – the most inclusive option – amounts to offering the best opportunity for a firm language base that can support cognitive health, academic success, and personal satisfaction [38].

There is no danger in a bimodal-bilingual approach; there is only increased opportunity. Bimodal bilinguals show no interference between spoken language and a sign language with respect to semantic fluency [39], perhaps because the articulators are different [40]; indeed, signing promotes cross-language processing [41]. Early sign language use helps deaf children, including those with CI, develop preliteracy skills [42,43]. One of the most important of those is the ability to make inferences, a skill that relies on a firm language foundation, where signing, being totally accessible, can provide that [44]. The biggest predictor of good reading skills is, in fact, a firm language foundation [45–52], including vocabulary knowledge [53–57]; where a wide vocabulary in a sign language helps in developing a wide vocabulary in reading. A firm language foundation has been shown repeatedly to be the best longitudinal predictor of reading skills whether a child has a CI or not [57–59]. Studies have concluded that deaf children with good signing skills ultimately do better at language skills, reading, writing, and other academic areas, and understand and produce the ambient spoken language better than those who do not use a sign language [43,52,56,60–70], whether their parents are hearing or deaf [71], although socio-demographic factors do play a secondary role in academic success [72]. An overview of studies over the past two decades makes clear that general language skills – the skills one gets from daily language interactions, those sorts of interactions common to signing deaf children but uncommon to many strictly speech-only deaf children – are foundational for reading in a multitude of ways [73]. Better reading skills in a deaf child translates into stronger comprehension of narrative and better reading scores as a deaf adult [51], which then translates into more opportunities for personal and professional satisfaction.

Other studies have concluded that the addition of signing does not contribute to better language skills [74] and some have concluded that more research is needed to determine if signing improves spoken language [75]. There is no evidence, however, that bilingual-bimodalism is detrimental to the child's development [75], while, we repeat, researchers recognize that a substantial number of prelingually deafened children with CI do not acquire a first language via CI alone.

If a deaf child should do well with accessing a spoken language (orally and/or by text) as well as signing, the child will be bilingual and receive the cognitive benefits of bilingualism [76–80]. One bimodal-bilingual advantage is that, when the same information is available to two or more sensory systems, the redundancy aids in making the information more salient [79] and aids children in learning how to direct their attention [81,82], where shared attention is critical to language development [83]. While these studies on redundancy evaluated hearing infants, there is no reason to expect that these findings would not hold for deaf children. In fact, there is reason to expect these findings to hold even more strongly for deaf children since gaining the attention of deaf children requires gaining their visual attention and maintaining it. A hearing child cannot decide not to hear; even if her visual attention strays, she is still exposed to information delivered by speech. But once the deaf child's visual attention strays, the connection to information delivered by speech becomes tenuous, since deaf children with CI rely to varying degrees on speechreading [84].

The takeaway is that early exposure to a sign language and the ambient spoken language results in greater competence in each of the languages [85]. Furthermore, deaf bimodal-bilingual children are able to negotiate both deaf and hearing environments, and grow up into deaf adults who have more social and professional opportunities and a wider array of potential sources of satisfaction in life [86].

Importantly, social interaction plays a critical role in first language acquisition, regardless of language modality [87–91]. And since social interaction is an important part of family life from birth on, it is also critical that families of deaf children learn to sign. This is where parents and, possibly, doctors, hesitate. People sometimes believe that raising deaf children with speech only is 'easier' than raising deaf children with signing, with or without a CI. The speech-only option requires long hours of daily training for years, training that the family is a crucial part of [92]. This is because a CI bypasses the ear canal and transforms auditory information into electrical impulses that are directly delivered to the cochlea [29,93], but the brain did not evolve to interpret that information, so intensive, extensive training is needed as an interface between machine and brain. The bimodal-bilingual approach, on the other hand, requires the family to learn a sign language, and, if the

child has a CI, this is on top of doing the habilitation work. However, the first approach (speech only) does not guarantee full first language acquisition while the second approach (bilingual-bimodal) does. That's the fact that must be faced. Issues of ease must not be allowed to prevail when so much is at stake. And, if the child is not one of the lucky with a CI, then, once it is clear that the CI is not offering language access, the rehabilitative training may be abandoned.

Rather than emphasizing the popular belief that learning a sign language might be onerous for some families, physicians can reframe the issue, pointing out that learning a sign language can be fun and rewarding for the entire family. Whole family communication is greatly improved by including a sign language, thereby granting deaf children the involvement in family life necessary for feeling their identity is recognized, respected, and valued, and allowing them to develop social tools that will stand them in good stead outside the family, as well. This involvement, in turn, leads to closer and stronger family relationships as the child grows older. Conversely, deaf children who do not gain (full) access to language via speech and hearing technology may have difficulty in participating in the family conversation and in the family's community gatherings that revolve around communication. Many parents may worry their deaf child will turn to the deaf community for acceptance and leave behind their hearing family entirely if they learn to sign. There is a lapse of logic here: the better the family communication is, the stronger the family ties are [94]. Deaf people may be attracted to a signing community of deaf people regardless of their language backgrounds [95], so they may feel more strongly attached to a family that signs than to one that does not. Lack of a feeling of belonging in a family because of difficulty of speech-only communication is a more likely reason that deaf children might grow apart from their families [96].

Just as a driver would be remiss not to put seatbelts on the children in their car no matter how well they drive, so should parents give their deaf child a sign language – because no matter how much habilitation training after CI a parent gives, there is no guarantee that the prelingually deaf child will acquire a first language via CI alone.

Certainly, family perspectives must be considered – and addressing the whole family's needs is critical to successful intervention [97]. How doctors advise can affect the psychological well-being of the parents [98]. When parents, especially mothers, feel empowered and confident about the choices they make, this influences deaf children positively: they have better language development, emotional sensitivity, reading competence, and problem solving; and they display higher cognitive flexibility, better social competence, and less impulsive behavior [99–102]. All this means that the physician's duty properly and crucially includes informing the family of the risks of linguistic deprivation in a way that they can easily comprehend and advising them to choose the approach that best supports the child's health: a bimodal-bilingual approach.

1.2. Q&A for parents

Humphries and colleagues [103] (hereafter H2016) argue that medical professionals should advise parents of deaf children to start themselves and their children on learning a sign language as soon as their child's auditory status is detected. H2016 address six common questions parents have and offer straightforward answers:

(H2016 1). What will give my child the best chances of learning to talk?
(H2016 2). How can my child learn sign language if I don't sign myself?
(H2016 3). Won't there be less family disruption and less work if I raise my child strictly orally (without signing)?
(H2016 4). Won't signing adversely affect my child's academic achievements? After all, bilingualism is confusing for a child.
(H2016 5). Can't we wait to see if our child succeeds with a CI before working to learn to sign?
(H2016 6). But won't I lose my child to deaf culture?

Parents should be sent to H2016 for answers to these questions. Here we repeat one of them (numbered H2016 2 above) and present a new set of common questions, offering answers based on work that has come to the fore since H2016. We hope these questions and answers will help medical professionals as they advise families. In particular, we ask medical professionals to consider these points as they counsel parents:

- Deafness is not an illness, although it may follow an illness. The child is not sick and will not die of it – so framing deafness negatively should have no part in the discussion.
- Deafness is not implicated in delayed development. Rather, linguistic deprivation is the cause. As long as the deaf child has a firm foundation in a first language (including a sign language) in the first few years of life, development proceeds at an ordinary rate.
- Learning to sign for both parents and child is more possible today than ever with the wide recognition and availability of ASL and other sign languages in their respective countries.

Research on the role of visual/gestural input in cognitive and language development is well established for both hearing and deaf babies. Today, there is a focus on compassion in modern health care settings [104], and it is imperative that parents should be informed of the above points in a positive and optimistic way. The discussion must eschew the uninformed negativity surrounding deafness and risks associated with deafness, and, instead, embrace positive, caring, encouraging, and scientifically accurate discussions of normal language and cognitive development in bimodal-bilingual environments. Questions such as the following ones that enter the minds of parents deserve responses with thoughtful and ethical deliberation. We answer the questions as fully as we can, in the hopes that medical professionals will help parents understand the impact of these answers for their particular situations.

1.2.1. How can I teach my child signing if I don't sign myself?

H2016 addresses this question, but we repeat it since it is inextricably related to the next question posed below. Parents may be inclined to think that children learn language entirely from them. Rather, children learn language from the various communities in which they participate – where, once they are of preschool age, the language of their peers outside the home may be the one they feel most comfortable with [105]. Children can be fluent bilinguals even when their parents are not fluent in both languages; that is, children transcend their parents' bilingual fluency [106]. This is as true for sign languages as for spoken languages: deaf children do not repeat the signing mistakes that their hearing parents make [107].

The burden of helping a deaf child acquire a sign language does not fall entirely and solely on the parents/family, just as the burden of teaching an immigrant child the language of the new country does not fall completely on the parents/family. The parents/family should become engaged with and involve the deaf child in a signing community, finding support from that community, rather than avoid the deaf community.

1.2.2. If my child learns to sign from the deaf community, do I still have to learn the sign language?

The short answer is a resounding yes. Because it can be a task for adults to learn a second language, it is important for parents to understand how crucial it is to undertake that task.

The key to deaf children developing the language faculty – so that these children reap all the benefits that language confers on human beings –is early exposure to an accessible natural language on a regular and frequent basis [5–7]. Unlike spoken languages, which may be partly or fully inaccessible to the deaf baby, sign languages are

completely accessible [24,25,108]. A cochlear implant cannot reliably be predicted to supply the foundation for first language acquisition [16–34,37,38], so signing is an essential ingredient in supplying that foundation. And because family life is a big part of the child's early language interaction, the family must sign with the child in addition to speaking [87–91].

For parents to provide a nurturing and anxiety free environment for early childhood development, signing at home is important even if their child also has the additional nurturing and care of a signing community. Signing at home allows caregivers to engage deaf children in group conversations, especially in family and extended–family gatherings. Deaf children need to be able to communicate with their families on a daily basis and feel engaged by their families – just as hearing children do. In 2012, a panel of experts – including parents, deaf professionals, early intervention program leaders, early intervention specialists, and researchers from ten nations – convened in Austria and identified ten family-centered foundational principles for addressing the early language and educational needs of deaf children –a list that is available online [109] – and their fourth principle is titled: Family-Infant Interaction. Children and parents need to engage in joyful and playful interactions that involve communication in order for the child to gain language and develop cognitively, emotionally, and psychosocially, but also in order to promote the well-being of the whole family. Parents and children who communicate and are emotionally available to each other and feel optimism as they engage with each other typically have a better life than those who do not. Parents are more confident and competent in their role of promoting the child's development and the deaf child is more confident and competent as an overall person.

All this means that language interaction should be built into daily routines and daily play. Furthermore, since a sign language is the only type of language that can be relied on as being fully accessible to deaf children, parents/families need to sign with their deaf babies as early as possible [80]. It is not just the early years of a child's life that matter for language acquisition; it's the early months, the early weeks, even the early days [110]. Children with CIs who are implanted very early (by 12 months of age) and who do not sign can show language delays years later attributed to lack of language interactions in the earliest parts of life [111]. Deaf infants and small children simply cannot wait – deprived of fully accessible language input – until their families feel 'ready' to sign. The whole family must learn simultaneously as the deaf child learns. Even moderate fluency on the part of the family benefits the child enormously [112,113]. And learning the sign language together can be one of the strongest bonding experiences that the family and deaf child have.

1.2.3. How do I, as a parent, go about learning a sign language? How do I meet the local deaf community and introduce my deaf child into it?

Parents need support in learning a sign language and in dealing with many new issues they will face as they raise their deaf children. Akin to other conditions that might place children at developmental risks (e.g., autism, ADHD, learning disabilities), parents should use all available resources, including doctors, local and national deaf community centers, deaf education services, articles, and books [114–116].

The Internet is an invaluable resource. Approximately three out of every 1000 newborns are deaf and an estimated 96% of them have hearing parents. As a result, there are many parents out there who have similar situations: they love their children and want to do what is best for them and they have little to no prior experience with a sign language. The Internet is full of information for these parents, sometimes offering conflicting advice, so parents may feel confused. It's important to look for websites that have a focus on language acquisition – not solely speech – and on joy in family interaction. Many websites can help parents get sign language lessons and other support. The following are a few examples of trustworthy websites in the United States (and there are comparable resources in many countries):

- https://www.nad.org/(National Association of the Deaf in the United States – filling out an online form will help connect parents with providers and NAD affiliates in the parents' area: https://www.nad.org/contact-nad/)
- http://deafchildren.org/(American Society for Deaf Children)
- http://www3.gallaudet.edu/clerc-center.html (Laurent Clerc National Deaf Education Center)
- https://www.mydeafchild.org/(which offers free sign language lessons)
- http://aslaccess.org/(which keeps track of digital means of learning ASL)
- http://www.dawnsign.com/(which publishes many video and picture books for parents and children learning ASL)

The Individuals with Disabilities Education Act in the United States describes early intervention services to families that choose a sign language (see 20 U.S C. § 1432(1)(E)(iii), https://www.law.cornell.edu/uscode/text/20/1432). Available services include teachers trained to work specifically with deaf children, and sign language lessons for the entire family. Compliance with this act is inconsistent from state to state and locality to locality. So, parents need to become advocates for their deaf children, including knowing their rights and standing firm as they request them, starting at the very beginning and continuing through their school years [117]. Parents should encourage deaf children to self-advocate; many potential problems – educational, psychosocial, and health – can be prevented if deaf children are prepared to handle such issues [118–120].

To help hearing families of deaf children learn a sign language, some scholars and practitioners are developing appropriate sign-language teaching curricula [121] and some are developing various technologies, such as mobile phone apps for sign language practice [122]. Ultimately, however, learning a sign language, like any language, requires frequent use in a range of communicative interactions; therefore, it is a matter of parents and their deaf children being exposed to signers, which include other deaf children and their parents, deaf adults, and even sign language interpreters. Local resources may be available, including playgroups, support groups, sign language classes in community centers, schools and colleges (sometimes specially designed for parents). Many cities have deaf and hearing community centers that offer sign language classes and organize community activities, so that parents and deaf children can meet other people who know a sign language and become part of that community. Many states have schools for the deaf, another rich source of deaf events and sign language learning opportunities [123]. Involving deaf sign language tutors and mentors helps bring sign language into the home in a family-bonding way [124]. Even families in remote areas are able to access many resources to help in effectively learning a sign language, including video lessons and practice as well as interactions with tutors online.

1.2.4. Is it a problem if I communicate with my child in a mixture of signing, gesturing, and speaking?

Alongside the development of well-established natural sign language acquisition, it is absolutely no problem if communication modes are mixed; in fact, it is advantageous for the child.

Prior to small children using identifiable language, they communicate with their care takers in a variety of ways, employing meaningful pointing by 11–12 months [125] and deictic gestures (such as lifting their arms to ask to be picked up or putting a toy cat in an adult's lap to get them to pet it), indicating reference and intent [126–128]. Repeated behaviors like these become ritualized communicative acts, something the adult and child immediately understand as part of their shared experiences.

These acts are developmental milestones, the start of a continuity from prelinguistic to linguistic skills [129]. For example, a child can pick up an empty spoon and put it in her mouth to show she's hungry. Then, in the absence of having a spoon, she can use the same handshape

she'd use in picking up that spoon and move it to her mouth – using a gesture the care giver understands [130]. The gesture then gains a specific meaning that is relatively stable across different contexts – and, thus, is a step in natural language development [131]. In children under a year old, gestural play and vocal productions coincide with the appearance of first words (and first signs), which, then, gradually get used outside of the gestural contexts [132,133]. A longitudinal study of Italian children from 10 to 23 months of age confirmed the link between early actions, gestures, and first words [131]. They conclude, and new research confirms, that actions, gestures, and words produced in a communicative context form a continuum, where care givers can speed up learning and communicative abilities by participating in the affirmation of each step along the way, leading to recognizable language usually by around 2 years of age [134–136]. Studies of language acquisition in other spoken language environments produce similar findings [137].

This whole process depends, importantly, on cooperative interaction between infant and caregiver. For hearing children, many studies reveal the importance of this early multimodal period in language development [138–140], where the participatory role of care givers can elicit richer communication from children [136,141,142] and is predictive of later child language abilities [143,144]. Today many cognitive psycholinguists accept the idea that human communication is a multimodal system in which embodied actions play a critical role as does multimodal feedback between infant and care giver [145–147]. The very act of gesturing and having that gesture receive appropriate response by the care giver might encourage the child to take the next step (of using lexical items). And, interestingly, gestures play a positive role in second language learning for children [148] and in learning math and science, where children are able to convey ideas through gestures that they cannot express verbally, and thus, are more receptive to abstract concepts [149,150].

Communicating with deaf children who have a CI using mixed modalities (signing, gesturing, speaking, writing, etc.) reflecting natural communication processes can, likewise, help them access and develop language more effectively than depending on a speech-only approach [151]. In fact, if you assess a deaf child's language skills only on the basis of their speech or their signing skills, you do not get an accurate picture of their overall language skills, which include a wide range of communication methods [152].

Since both co-speech gestures and gestures independent of speech carry meaning that adults and children can access, regardless of the particular spoken or sign language they use [153,154], it is unsurprising that mixed communication modes are entirely natural, not just in communication with children, but in many communication situations, particularly multi-lingual ones [155]. Many speakers gesture as they speak; many signers mouth spoken language words; in some sign languages, fingerspelling is used quite often, in others, not so often. However, it is when deaf children have full access to a language that they are able to benefit most from other modes of communication. That is, acquisition of a language is achieved by exposure to that language but it is natural to use these other modes of communication, as well.

When speech communication doesn't work or when signing fluency is limited – such as when one might not know the relevant sign with no easy access to a dictionary at that moment – the sensible thing to do is to draw on whatever means are available for effective communication.

Most deaf children and adults grow up using speechreading to a lesser or greater extent. Signing deaf children have frequent interactions with non-signers and may or may not prefer to attempt speechreading. Even those deaf children who do very well with CI depend on speechreading to a great extent [53]. It can be exhausting for children (and adults) to constantly search the face of speakers for information to help them guess at what specific sound is being articulated. Having all other modes of communication available for use with a deaf child might be a relief from speechreading.

1.2.5. What is a good model for the kind of language and communication environment that my deaf child and I should strive to be in?

Using multiple languages and means of communication, or *translanguaging*, fits well with recent research on the multimodal nature of learning [156], and translanguaging in early childhood and in early educational situations appears particularly effective [157]. When there is emerging language proficiency, as is the case for most deaf children, and when there is emergent bilingualism, as is the case for immigrants as well as hearing parents with deaf children [158–160], translanguaging is ideal, since no hierarchy is given to the languages used; rather, a person's full linguistic repertoire is deployed, resulting in freedom from social and political boundaries associated with individual languages [161] and resulting in better overall communication.

Dialogic talk between teacher and child – that is, true back-and-forth talk, rather than presentation by the teacher and absorption by the child – is also an important part of developing the child's critical thinking skills, argumentation skills, and disciplinary knowledge [162]. Dialogic talk is enhanced by translanguaging for children, where deaf children benefit strongly [163,164]. Being encouraged to question, probe, and challenge at home and at school with whatever means a child has empowers that child intellectually – whether the child be hearing or deaf, monolingual or multilingual.

In order for translanguaging to be most effective for deaf children during the critical period for language acquisition, sign language needs to be a frequently used component in the language and communication repertoire. Such a language and communication environment is rich, accessible, and meaningful, and allows for joint activity among deaf children, their families, and their peers, as well as richer activity in encounters with strangers.

Ideally, deaf children should be placed in educational situations that expose them to the languages they know and need to use in their social environment. Often the best translanguaging models for deaf children are also deaf – yet another reason why deaf children should be in contact with other deaf people regularly and frequently.

1.2.6. Besides learning a sign language and using it with my deaf child, what else should I be doing as a parent?

Parents of deaf children should do all those things that any parent and child typically do, including cuddling, playing, cooking, gardening, laundering, sports … whatever activities are involved in enjoying life together. Including deaf children in these activities protects the child from emergence of depressive or anxiety disorders [13,96]. Engaging in these joint activities gives meaning to the language and communication interactions. Meaning-making is an important goal, as learning to understand the world and develop a theory of mind together support development of language fluency [165,166]. Without this ability to make meaning via language, essential cognitive functions are at risk. Sign language provides access to unambiguous meaning-making for deaf children with or without CI, but activities evoking meaning bring it to life: children observing parents, being with parents communicating about what things are and how they work, as well as creating, problem solving, and figuring things out are also essentials of development [167]. Parents should actively engage their deaf children in everyday life, even if it requires some additional effort or adjustment, because this investment will pay off for the deaf adults they become and for their families in the long run.

Computer and internet technology can be beneficial to parents (service organizations might provide assistance to obtain access to online information and activities). Parents can look up signs they do not know as they engage in activities together with their children. There are multiple sites that are useful for this purpose, including:

- http://www.lifeprint.com/
- http://www.aslpro.com/
- https://www.handspeak.com/
- https://www.signingsavvy.com/

Sharing books with a developing child is an activity that strongly correlates to achieving literacy skills. Because it might be difficult for some parents and children to gain satisfaction from sharing a traditional picture book (with its static illustrations and text), parents should consider using the growing number of videos and eBooks available, with a signer telling the story, and, often, text as well as illustrations. Early intervention providers can guide parents, as can professionals at Gallaudet University [168]. Many of these resources are available free on the internet, and more are being added all the time [169]. Through telling and retelling stories, deaf children learn the structure of narrative and characterization, and they develop theory of mind. Parents who share books with their deaf children and interact with them about the stories in those books can be instrumental in helping their deaf children learn to read [170].

1.2.7. I am overwhelmed with conflicting advice. What messages about my deaf child and me should I be paying attention to?

Older and outdated narratives about sign languages, deaf children's outlook, parents' role, hearing technologies, and educational strategies – these things bombard parents. The job is to filter through them. Medical professionals can guide parents through this morass: rather than focusing on deficits, a positive narrative supported by recent research will help parents raise children to become well-adjusted, well-functioning deaf adults who can participate fully in their societies.

A positive message for parents to attend to is that deaf children who learn a sign language early, including those who have a CI, are less likely to experience language delays or linguistic deprivation [38,86]. They are able to learn a spoken language (or the text of one) better because they can base spoken language acquisition on a strong first-language foundation in a sign language [41,43,52,56,60–70,85]. They benefit from bilingualism cognitively, psycho-socially, and professionally [86,171–175]. Parents who choose to use a sign language with their deaf children early enable the family to grow together in a community of hearing and deaf signers and enjoy the culture of deaf communities [172,173]. If there is a bottom line, it is that parents and families who are able to sign with their grown deaf children enjoy closer relationships in the long run because parents and families will have recognized and accepted their children's deafness by taking the time and effort to learn and use a truly accessible visual language [94–96].

Competing interests

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